

What is claimed is:

1. A hydraulic shift gear mechanism for a bicycle having a handlebar, the shift gear mechanism comprising:

a control lever;

a positioning mechanism actuatable by the control lever, the positioning mechanism having:

a bracket;

a pivot shaft spaced apart from the handlebar and fixedly secured to the bracket;

a rotating member rotatable in a first direction and a second direction about the pivot shaft;

a push mechanism comprising a first latch segment and a push pawl biased toward the first latch segment and configured to cooperate with the first latch segment to rotate the rotating member in a first direction; and

a return mechanism comprising a second latch segment and a return pawl, the return pawl having a first claw and a second claw which alternately engage the second latch segment when the rotating member is rotating in the second direction;

a master cylinder assembly operatively connected to the rotating member of the positioning mechanism, the master cylinder having a piston that is movable in a push direction when the rotating member rotates in a first direction, and is movable in a return direction when the rotating member rotates in a second direction;

a slave cylinder assembly;

a conduit conveying a fluid between the master cylinder assembly and the slave cylinder assembly; and

a derailleur operatively connected to the slave cylinder assembly and movable in response to the actuation of the master cylinder assembly.

2. A shift control device attachable to the handlebar of a bicycle for controlling the piston of a master cylinder of a hydraulic shift mechanism, the shift control device comprising:

- a bracket attachable to the handlebar;
- a pivot shaft spaced apart from the handlebar and fixedly secured to the bracket;
- a rotating member rotatable in a first direction and a second direction about the pivot shaft;
- a control lever operatively connected with the rotating member and biased in a neutral position;
- a push mechanism configured to cooperate with and rotate the rotating member in the first direction; and
- a return mechanism configured to cooperate with and rotate the rotating member in the second direction.

3. The shift control device of claim 2, wherein the push mechanism comprises a first latch segment and a push pawl biased toward the first latch segment and configured to cooperate with the first latch segment to rotate the rotating member in a first direction, and wherein the return mechanism comprises a second latch segment and a return pawl, the return pawl having a first claw and a second claw which alternately engage the second latch segment when the rotating member is rotating in the second direction.

4. The shift control device of claim 3, further comprising:

- a pinion gear rotatable about the pivot shaft and operatively connected to the rotating member wherein the pinion gear rotates with the rotating member; and
- a rack gear engaged with the pinion gear and operatively connected to the piston of the master cylinder, wherein the rotation of the rotating member in the first direction

corresponds to a movement of the piston in a push direction and the rotation in the second direction corresponds to a movement of the piston in a return direction.

5 5. The shift control device of claim 2 wherein the master cylinder comprises a primary piston and a secondary adjuster piston.

10 6. A method of adjusting an initial position of a slave piston in a hydraulic shift gear mechanism, comprising the steps of:

 providing a master cylinder in communication with a slave cylinder, the master cylinder attachable to a bicycle handlebar by a bracket and having a secondary piston threadingly engaged therein; and

 rotating the secondary piston to vary the depth in which the secondary piston extends into the master cylinder.

20 7. A shift control device attachable to the handlebar of a bicycle for controlling the piston of a master cylinder of a hydraulic shift mechanism, the shift control device comprising:

 a bracket attachable to the handlebar;

25 a pivot shaft spaced apart from the handlebar and fixedly secured to the bracket;

 a rotating member rotatable in a first direction and a second direction about the pivot shaft;

 a control lever operatively connected with the rotating member and biased in a neutral position;

30 a push mechanism comprising a first latch segment and a push pawl biased toward the first latch segment and configured to cooperate with the first latch segment to rotate the rotating member in a first direction;

a return mechanism comprising a second latch segment and a return pawl, the return pawl having a first claw and a second claw which alternately engage the second latch segment when the rotating member is rotating in the second direction;

5 a pinion gear rotatable about the pivot shaft and operatively connected to the rotating member wherein the pinion gear rotates with the rotating member; and

10 a rack gear engaged with the pinion gear and operatively connected to the piston of the master cylinder, wherein the rotation of the rotating member in the first direction corresponds to a movement of the piston in a push direction and the rotation in the second direction corresponds to a movement of the piston in a return direction.

8. A method of shifting gears in a hydraulic shift gear mechanism for a bicycle having a piston and a master cylinder, comprising the steps of:

providing a shift control lever spaced apart from the handlebar, wherein the lever is biased in a neutral position and movable in a first direction and a second direction, and wherein the neutral position is between the first and second directions;

operating the lever in the first direction to control the motion of the piston in a push direction;

25 operating the lever in the second direction to control the motion of the piston in a return direction; and

wherein the control lever returns to the neutral position after operation.

30 9. The method of claim 8 wherein the first direction is the direction from the neutral position toward the handlebar, and the second direction is the direction from the neutral position away from the handlebar.

10. A hydraulic shift gear mechanism for a bicycle having a handlebar, the shift gear mechanism comprising:

a control lever;

a positioning mechanism actuatable by the control lever,
the positioning mechanism having:

a pivot shaft;

a rotating member rotatable about the pivot shaft;

a push mechanism configured to cooperate with and rotate the rotating member in a first direction;

a return mechanism configured to cooperate with and rotate the rotating member in a second direction;

a slave cylinder assembly;

a master cylinder assembly operatively connected to the rotating member of the positioning mechanism, the master cylinder assembly having a primary piston that is movable in a push direction when the rotating member rotates in a first direction and is movable in a return direction when the rotating member rotates in a second direction;

a conduit conveying a fluid between the master cylinder assembly and the slave cylinder assembly, the conduit having a volume; and

an adjuster piston threadingly engaged with the master cylinder assembly and operable to adjust the volume of the conduit.

11. A hydraulic shift gear mechanism for a bicycle having a handlebar, the shift gear mechanism comprising:

a control lever;

a positioning mechanism actuatable by the control lever;

a master cylinder assembly operatively connected to the positioning mechanism, the master cylinder assembly having a primary piston and an adjuster piston;

a slave cylinder assembly;

a conduit conveying a fluid between the master cylinder assembly and the slave cylinder assembly; and

a derailleur operatively connected to the slave cylinder assembly and movable in response to the actuation of the master cylinder assembly.

12. The hydraulic shift gear mechanism of claim 11 wherein the adjuster piston is threadingly engaged with the master cylinder, wherein the conduit has a conduit volume, and wherein the adjuster piston is rotatably movable to adjust the conduit volume.

13. The hydraulic shift gear mechanism of claim 11 wherein the positioning mechanism comprises a bracket attachable to the handlebar of the bicycle and wherein the master cylinder assembly is attached to the bracket.

14. A hydraulic shift gear mechanism for a bicycle having a handlebar, the shift gear mechanism comprising:

a control lever;

a positioning mechanism actuatable by the control lever, the positioning mechanism having a bracket attachable to the handlebar of the bicycle;

a master cylinder assembly attached to the bracket of the positioning mechanism, the master cylinder assembly having a primary piston operatively connected to the positioning mechanism and an adjuster piston, the adjuster piston threadingly engaged with the master cylinder assembly;

a slave cylinder assembly;

a conduit conveying a fluid between the master cylinder assembly and the slave cylinder assembly, the conduit having a conduit volume, wherein the adjuster piston is rotatably movable to adjust the conduit volume; and

a derailleur operatively connected to the slave cylinder assembly and movable in response to the actuation of the primary piston of the master cylinder assembly.

090346-05001
104090-9432850